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**Tri-Service CADD/GIS  
Technology Center**

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# **Survey Engineering Monumentation Management System (SEMMS) User's Manual Version 2.0**

**WES**

Approved for Public Release; Distribution is Unlimited

Prepared by Tri-Service CADD/GIS Technology Center  
U.S. Army Corps of Engineers, Waterways Experiment Station  
Information Technology Laboratory

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# Preface

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The Survey Engineering Monumentation Management System (SEMMS) User's Manual describes the system designed and developed by the Tri-Service CADD/GIS Technology Center (Center) for the archival, retrieval, and cataloging of survey monumentation. The Waterways Experiment Station (WES) functioned as a central coordination point for the development of this capability, with additional technical direction provided by members of the Tri-Services community.

This report is a product of the Tri-Service CADD/GIS Technology Center Project Number 98.045, Continued Development of a Data/Project Management System for Survey Engineering. The project was funded and conducted by the Tri-Service CADD/GIS Technology Center, Information Technology Laboratory (ITL), U.S. Army Engineer Waterways Experiment Station. The Tri-Service CADD/GIS Technology Center was chartered in 1992 to promote the use of CADD and GIS technologies for life-cycle facilities management within the Army, U.S. Army Corps of Engineers, Navy, and Air Force. The Center operates under the guidance of Dr. N. Radhakrishnan, Director, ITL, and Mr. Harold Smith, Chief, Tri-Service CADD/GIS Technology Center. The Center functions under the guidance of several oversight committees including the Executive Steering Group (ESG), Executive Working Group (EWG), Field Technical Advisory Group (FTAG). The Civil Works Field Working Group served as the project sponsor and provided technical guidance for the project. Members of these groups are listed below.

Executive Steering Group Membership		
Name	Membership	Affiliation
Dwight Beranek	Chair	Corps of Engineers
Carl Enson	Member	Corps of Engineers
Gary Erickson	Member	Air Force
Dr. Get Moy	Member	Navy
Stan Shelton	Member	Army

<b>Executive Working Group Membership</b>		
<b>Name</b>	<b>Membership</b>	<b>Affiliation</b>
Dana (Deke) Smith	Chair	Navy
Mikeual Perritt	Member	Air Force
Peter J. Sabo	Member	Army
M.K. Miles	Member	Corps of Engineers
Ron Hatwell	Member	Corps of Engineers
Dr. N. Radhakrishnan	Member	Corps of Engineers
Thomas M. Karst	Member	Defense Logistics Agency
Jim Carberry	Member	Navy
Randy Lierly	Member	Air Force
Thomas R. Rutherford	Member	OSD
Jim Whittaker	Member	OSD
Paul Herold	Member	Coast Guard
William A. Meyers	Member	Air Force
Richard F. Holihan	Member	Marines

<b>Field Technical Advisory Group (FTAG) Membership</b>		
<b>Name</b>	<b>Membership</b>	<b>Affiliation</b>
Randy Lierly	Chair	Air Force
James Ott	Member	Army
Victoria Williams	Member	Air Force
Bobby Bean	Member	Navy
Roderick Chisolm	Member	Army
Phil O'Dell	Member	Corps of Engineers
Eugene Tickner	Member	Corps of Engineers
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Carolyn Wilber	Member	Navy
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<b>Civil Works Field Working Group</b>		
<b>Name</b>	<b>Membership</b>	<b>Affiliation</b>
Blaise Grden	Chair	Corps of Engineers
Ralph Scheid	Vice-Chair	Corps of Engineers
Trish Anslow	Member	Corps of Engineers
Arthur Bennett	Member	Corps of Engineers
Stephen Cobb	Member	Corps of Engineers
Patrick Fitzgerald	Member	Corps of Engineers
Dave Gerczak	Member	Corps of Engineers
Stephen Long	Member	Corps of Engineers
Steve Meyerholtz	Member	Corps of Engineers
Ron Santos	Member	Corps of Engineers
Terry Theisen	Member	Corps of Engineers
Doug Wolf	Member	Corps of Engineers

A critical component of SEMMS is the Corps of Engineers, Topographic Engineering Center (TEC), developed application, Corpscon. Corpscon is a MS-Windows-based program which allows a user to convert coordinates between Geographic, State Plane and Universal Transverse Mercator (UTM) systems on the North American Datum of 1927 (NAD 27), the North American Datum of 1983 (NAD 83) and High Accuracy Reference Networks (HARNs). Corpscon also performs vertical conversions to and from the National Geodetic Vertical Datum of 1929 (NGVD 29) and the North American Vertical Datum of 1988 (NAVD 88). Corpscon also calculates geoid-ellipsoid separations based on the NGS program Geoid96. The following web link is provided for further information concerning Corpscon.

<http://crunch.tec.army.mil/software/corpscon/corpscon.html>

TEC also assisted in the production of SEMMS compatible data-files of the National Geodetic Survey' (NGS) "datasheets" encompassing the entire United States. See the following NGS web link for further information concerning datasheets.

<http://www.ngs.noaa.gov/datasheet.html>

The software programming was performed under a contract with the Intergraph Corporation executed by Mike Grounds during the period from August 1997 to March 1999. The WES management Point of Contact was Mr. Harold Smith. The technical Points of Contact were Dr. V. Danushkodi with the Center and Mr. Arthur Bennett with the U.S. Army Corps of Engineers, Jacksonville District.

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## About this Document

This document contains six chapters.

### **Chapter 1: Program Installation**

This chapter explains how to install SEMMS. The directory structure and associated files will be described. This section will detail which files are required in which directories when the program is installed. Two database configurations are discussed, a local database configuration and a remote central database on a networked drive. Necessary environment variables and directory path indicators are identified and discussed.

### **Chapter 2: Starting SEMMS**

This section describes how to set up a SEMMS desktop icon, and how to start SEMMS.

### **Chapter 3: Adding Control Points**

This chapter describes the various methods for adding control points to the database. Procedures for importing existing digital data and the procedure for adding new monuments to the database are described.

### **Chapter 4: Searching for Control Points/ Modifying Monument Fields**

This chapter describes how SEMMS is used to search for control points. It describes how to search based upon a specified criteria, and how to perform spatial searches. This section shows how to view and print summary and detailed reports of query results. Export capabilities are described for outputting query results to ASCII files, .dxf graphics files, or to a field database. This section also describes how to modify the fields associated with monuments satisfying the query criteria.

### **Chapter 5: Database Management**

This chapter describes how to manage the domains associated with selection lists for many of the fields composing a monument record. The procedures for viewing a field's domain list, adding to the list, and deleting a value from the list are discussed.

### **Chapter 6: Database Construction/Schema**

This chapter provides a complete description of all tables in the SEMMS database, monument.mdb. The fields which compose each table are defined and the primary information flow between tables is illustrated.

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## 1. Program Installation

This chapter explains how to install SEMMS. The directory structure and associated files will be described. This section will detail which files are required in which directories when the program is installed. Two database configurations are discussed, a local database configuration and a remote central database on a networked drive. Necessary environment variables and directory path indicators are identified and discussed.

### 1.1 Installing SEMMS

This section assumes that the computer workstation is an Intel-based 486 (or above) computer. The computer has at least 16 Mbytes of RAM and at least a 640 Mbyte Hard Drive. The computer is running Windows NT 4.0 or Windows 95. To install SEMMS, run the setup.exe file included with the installation files.

#### 1.1.1 Directory Structure

The base directory for SEMMS can be placed anywhere on the Hard Drive. The default directory location suggested by the installation program is c:\Program Files\semms. There must be a subdirectory under the directory pointed to by the SEMMS environment variable named "tempngs". This is a directory used for temporarily holding uncompressed NGS data.

#### 1.1.2 Necessary Files

The next section, Section 1.1.3, discusses how to set environment variables. SEMMS uses one, SEMMS. SEMMS indicates where the main monumentation database (monument.mdb) is located, locally or on a remote drive.

The following files are required to be in the directory pointed to by the environment variable SEMMS:

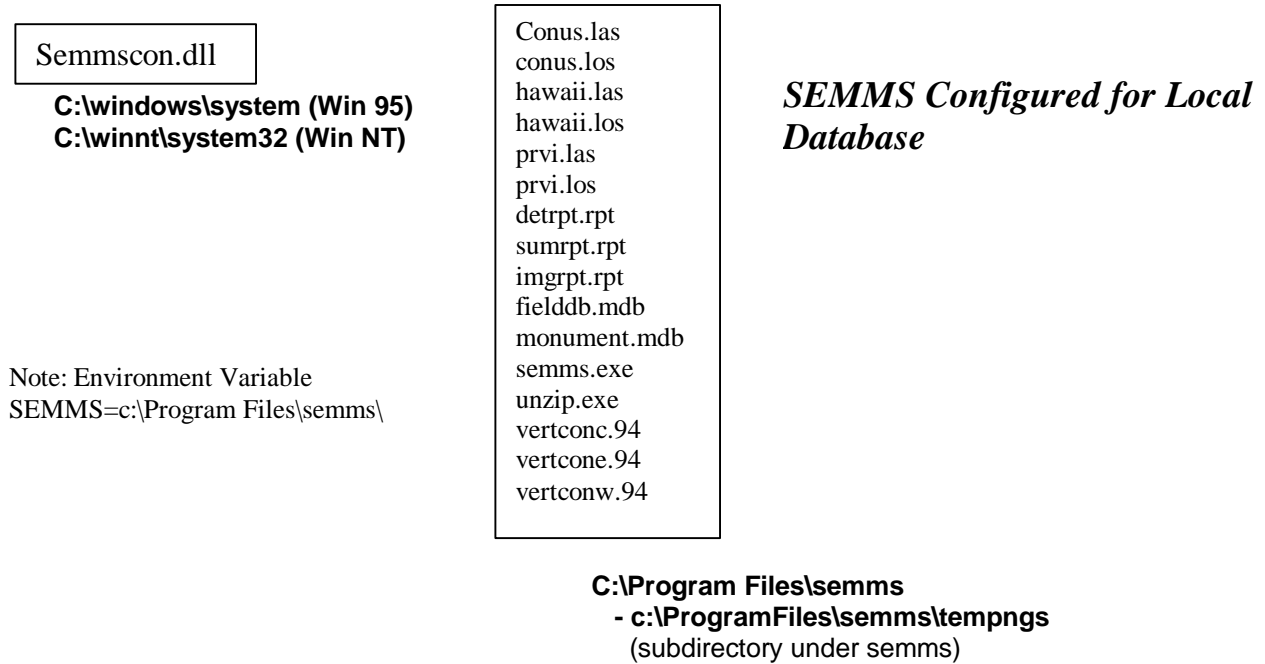
o conus.las	Horizontal Datum shift file used by integral Corpscon
o conus.los	Horizontal Datum shift file used by integral Corpscon
o hawaii.las	Hawaii Datum shift file used by integral Corpscon
o hawaii.los	Hawaii Datum shift file used by integral Corpscon
o prvi.las	Puerto Rico/Virgin Islands Datum shift file
o prvi.los	Puerto Rico/Virgin Islands Datum shift file
o detrpt.rpt	Hardcopy report template used for detailed report
o imgrpt.rpt	Details report template used with scanned images
o fielddb.mdb	Blank SEMMS database for generating a field database
o monument.mdb	SEMMS main monumentation database
o sumrpt.rpt	Hardcopy report template for used for summary report
o unzip.exe	Unzip utility for NGS import
o vertconc.94	Vertical Datum shift file used by integral Corpscon
o vertcone.94	Vertical Datum shift file used by integral Corpscon
o vertconw.94	Vertical Datum shift file used by integral Corpscon

The following files are required to be in the directory SEMMS is installed into:

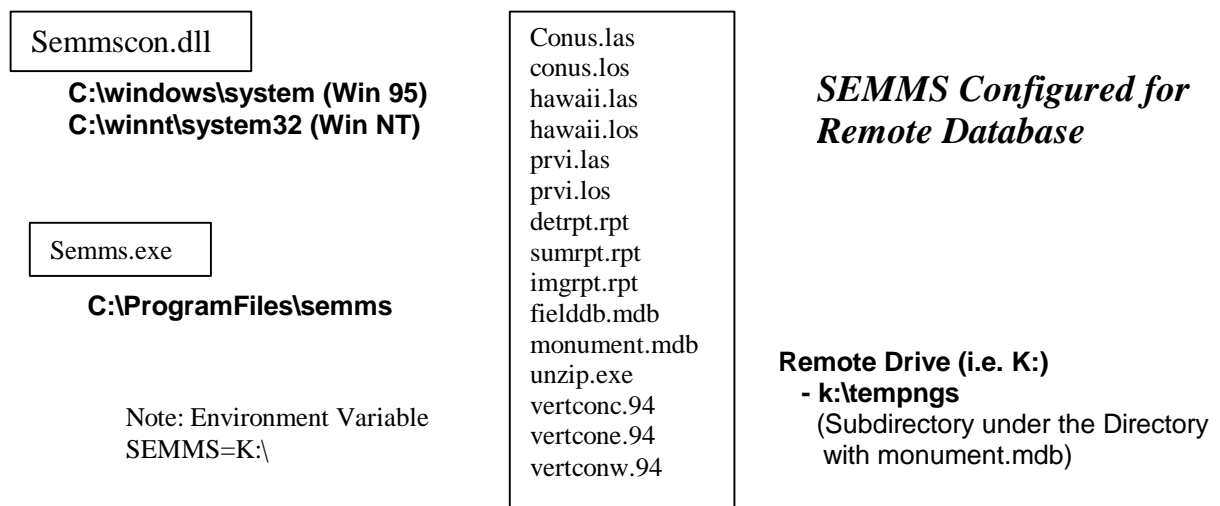
o semms.exe

There is another file required by the integral Corpscon software. Semmscon.dll must be in the c:\windows\system directory on Windows 95 or in the c:\winnt\system32 directory on Windows NT. This file should be placed automatically by the installation program.

This translates into the following directory/file structure for SEMMS configured for a local database:



When SEMMS is configured for a centralized database on a remote network drive the following directory/file structure should be used:



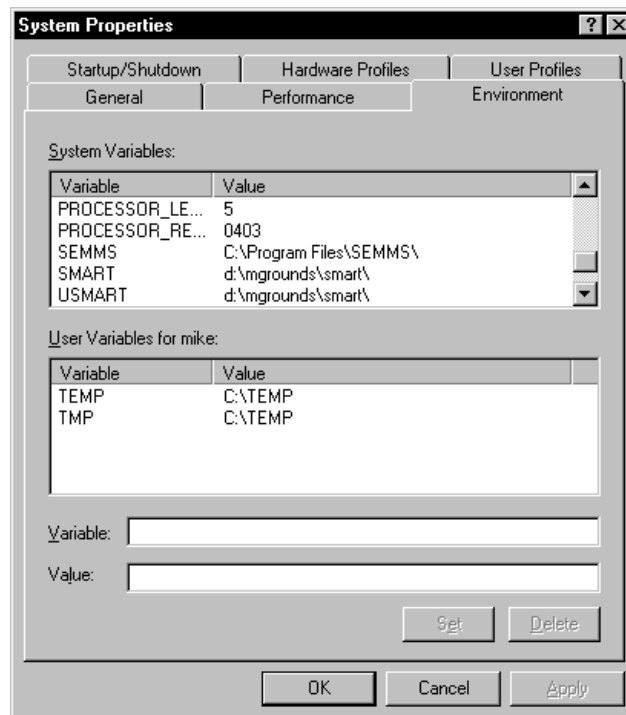
### 1.1.3 Setting Environment Variables

This section discusses how to set environment variables. SEMMS uses one, SEMMS. This variable points to the directory containing the main monumentation database. This environment variable flexibility is necessary so that SEMMS can be configured for either a local database or a centralized database on a remote networked drive. Setting environment variables is very different between Windows NT and Windows 95. These procedures are discussed separately in the following sections.

#### 1.1.3.1 Windows NT

To set the SEMMS system environment variable, take the following steps:

- O Log on to the computer as administrator
- O From the Taskbar, go to Settings -> Control Panel
- O Double Click the "System" icon in the Control Panel Groupbox
- O Then Select the "Environment" Tab to see the Environment Variables



- O In the System Variables window, select ANY existing Environment Variable. The two Fields at the bottom of the form will then be filled in.
- O Double-Click on the "Variable" Field (the upper bottom field) to highlight the entire Value.
- O Then type in "SEMMS".
- O Double-Click on the "Value" Field (the lower bottom field) the highlight the entire value.

O Then type in the directory location of where the monument database (monument.mdb) was placed, which was set in Section 1.1.1. For a default directory installation of SEMMS with a local database, type "c:\Program Files\semms\". For a remote database, type "K:\", where K is the network drive. **It is very important that the slashes lean in the right direction and that the end slash be included.**

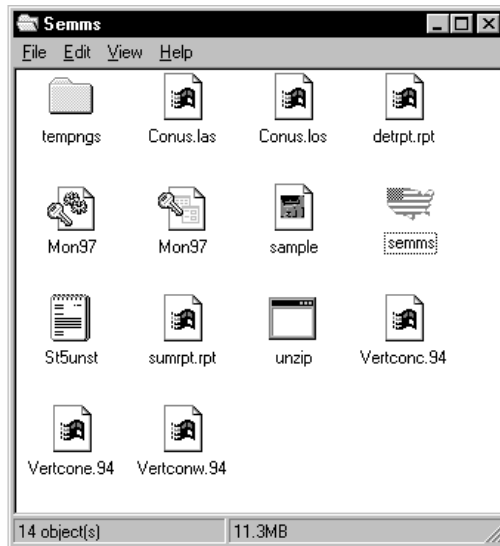
SEMMS is now ready to run.

#### 1.1.3.2 Windows 95

Environment variables in Windows 95 are set by modifying c:\autoexec.bat. Open autoexec.bat using the DOS editor or notepad. Then move to the bottom of the file and type in the directory location of where the monument database (monument.mdb) was placed, which was set in Section 1.1.1. For a default directory installation of SEMMS with a local database, type "SEMMS=c:\Program Files\semms\". For a remote database, type "SEMMS=K:\", where K is the network drive. **It is very important that the slashes lean in the right direction and that the end slash be included.**

## 2. Starting SEMMS

This section describes how to set up a SEMMS desktop icon, and how to start SEMMS. A desktop icon (or shortcut) is created by using the “My Computer” icon on the desktop. Then navigate through the directory structure to where semms.exe is located. You should see a window, or groupbox, which includes semms.exe as shown below:



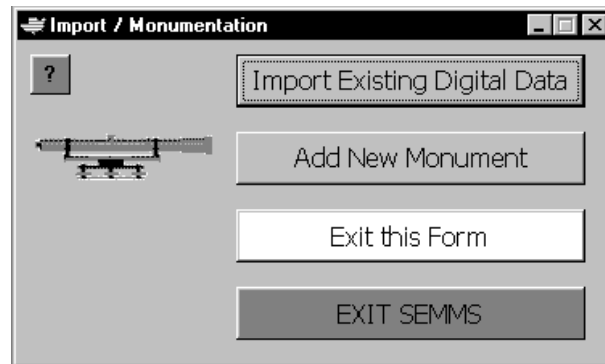
Drag the “flag” icon labeled semms, off of this window and onto the desktop. When the mouse button is released the icon will be added to the desktop icons. SEMMS may also be started using the Windows start bar. When SEMMS is started, the main form shown below will be displayed.



The main switch board provides workflow paths into the three branches of the program, searching or querying the database, adding new monuments to the database, and database management. Also note the release number shown on the bottom of the form. This number is incremented each time a new release is generated. To improve the utility of the user interface SEMMS uses a color code for buttons. Red buttons exit SEMMS, Yellow buttons exit the current form, and Purple buttons provide Help text.

### 3. Adding Control Points

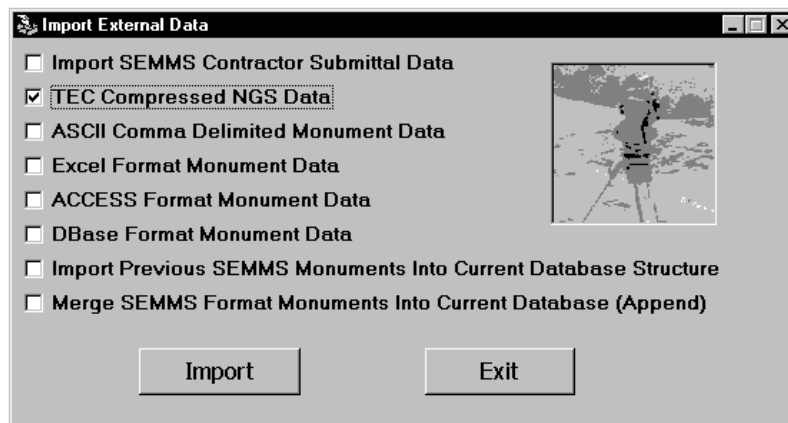
This chapter describes the various methods for adding control points to the database. Procedures for importing existing digital data and the procedure for adding new monuments to the database are described. When the “Add Control Points” button on the SEMMS main form is pressed, the following form is displayed:



Use the “Import Existing Digital Data” button to import data from ASCII files, TEC-compressed NGS data, Excel data, ACCESS format data, Dbase Format data, Contractor submittal data, or to import existing SEMMS monuments into an updated database structure, or to merge two SEMMS databases together. The “Add New Monument” button allows an operator to add new monument data to the SEMMS database. “Exit this Form” returns to the SEMMS main form. “Exit SEMMS” terminates the program. The import capability and the adding new monument capability are described in the following sections.

#### 3.1 Importing Existing Digital Data

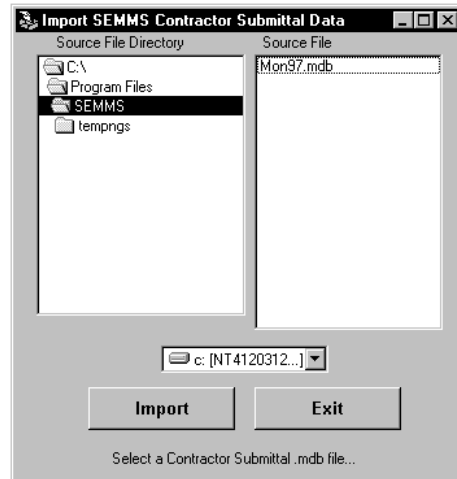
To import monuments from external data sources, press the “Import Existing Digital Data” button. The form shown below will be displayed.



Select the source of the external data, then press the “Import” button. Each of the import capabilities shown on this form are discussed in the following sections.

### 3.1.1 SEMMS-format Contractor Submittal Data

This capability allows contractor submittal data in SEMMS format to be merged into the main monument database. When this option is selected and the import button is pressed the following form is displayed.

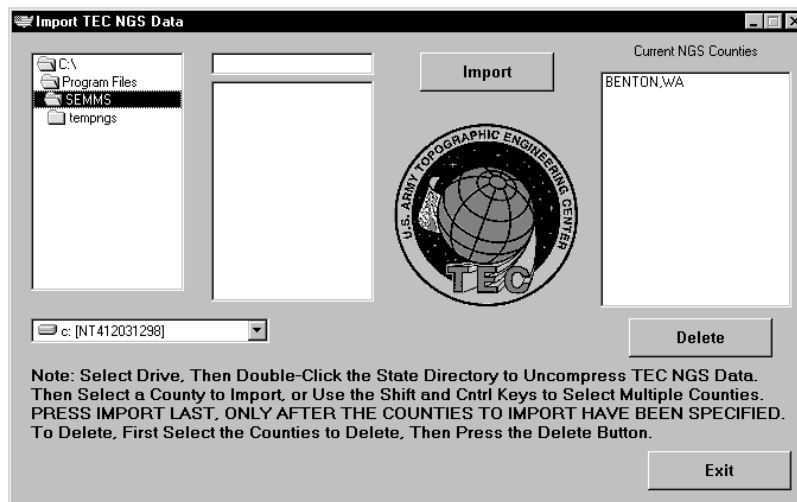


Use the drive and directory options to locate the source file to be imported. Then, select the source file and press the "Import" button. As each monument in the file is imported, it's designation is displayed in the status/prompt line at the bottom of the form. When all desired submittal files have been processed, press the "Exit" button to return to the import options form.

### 3.1.2 TEC-Compressed NGS Data

TEC has compressed NGS data into compact binary data files. These files are available on a single CD from WES. It is critical to maintain the same directory structure if sections of the NGS data are copied from CD to the local drive. The name of the zipped file in a directory **MUST** match the state name of the directory.

When this import method is selected, the following form is displayed.



First, use the drive and directory lists to get to the directories of NGS data. Double-click on the state name to uncompress the NGS data. **It may take a few moments for the data to uncompress.** A list of counties will then be displayed. Use the Shift and <cntrl> keys to select a range of counties or multiple selected counties. Lastly, press the import button to add the monuments to SEMMS. As each monument is added it's PID will be shown in the status line at the bottom of the form.

This form shows a list of counties (and states) of NGS data currently in the database. Selected counties may be deleted by selecting them from the list of "Current NGS Counties" and then pressing the "Delete" button below the list.

When all desired NGS Counties have been processed, press the "Exit" button to return to the import options form.

### 3.1.3 Input Templates for External Interfaces

Input templates allow an operator to define and save linkages between external data fields and SEMMS fields, to define append fields, and to then save and recall these linkages from named data files. Input templates can be used for importing comma delimited ASCII, Excel, ACCESS, and Dbase-format monument data. To save an input template, define all of the linkages and append fields as described in Sections 3.1.4 – 3.1.7. Press the "Save Linkages" button. A file manager dialog box will be displayed. Then, either select a template file to overwrite or name a new template file, and then press the "Select and Exit" button. To select a previously stored linkage template, press the "Recall Linkages" button, select the file from the file manager dialog box, and then press the "Select and Exit" button.

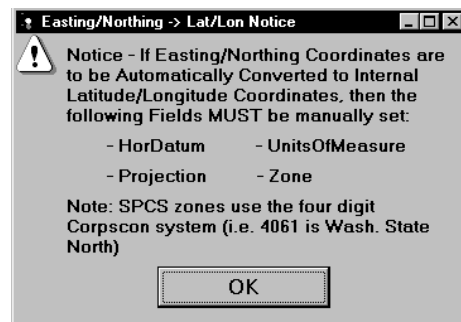
### 3.1.4 Comma-Delimited ASCII Files

This capability allows comma-delimited ASCII data to be imported into the main monument database. **Note: each line of the ASCII file MUST have the same number of fields.** When this option is selected and the import button is pressed the following form is displayed.



Using the Drive and directory list, navigate the directory structure until the ASCII file is displayed in the "Source File" list. When the file is selected, the first line of ASCII data is displayed in the line at the bottom of the form. The number of fields are also counted and displayed in the "Linkages List" as unlinked fields. In order to import the data, the program must know what each field of the ASCII data corresponds to in the monument database record. Select a field from the Linkages List and a field from the "SEMMS Permissible Fields", then press the "Link" button to establish the linkage. Established linkages can be unlinked by selecting the linkage and pressing the "Unlink" button. **Not all of the ASCII fields have to be linked.** Additional database fields may be populated for each imported record by using append fields. Select a SEMMS permissible field. If the field has a domain associated with it the possible values are shown in the "Selected Field Domain Value" pull-down list. If the field has no domain, then just type the desired value into the "Selected Field Domain Value" field. Press the "Append to Each Imported Record" button. The additional value to store will be shown in the Linkages List. Append values may be deleted by selecting it from the Linkages List and then pressing the "Delete Selected Field" button.

If the input data coordinate system is in Easting/Northing, and not Latitude/Longitude, SEMMS will automatically calculate and populate the Latitude/Longitude fields. When the Easting linkage is established, the following form will be displayed reminding the operator of the information needed to perform the conversion.



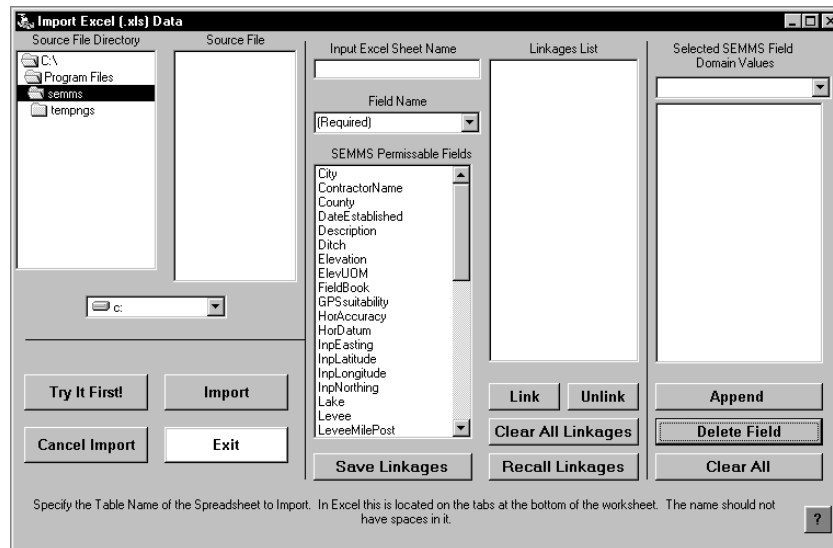
When the mapping between ASCII fields and SEMMS fields has been completed press the "Try It First" button. As each monument record is imported, it's designation is shown in the status line at the bottom of the form. The import operation can be cancelled by pressing the "Cancel Import Operation" button. The monuments will be imported into a temporary data base table in order to test the operation. If any records fail to import, a descriptive error message will be displayed suggesting possible causes of the problem. If all records import successfully, then press the "import" button to actually import them in the monumentation table.

When all desired ASCII files have been processed, press the "Exit" button to return to the import options form.

### 3.1.5 Excel Spreadsheets

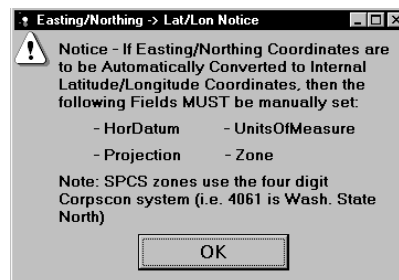
This capability allows monument data to be imported from Excel spreadsheets. **Note:** **The spreadsheet must be in row/column format where every value in a row always corresponds to the same SEMMS field. Also, there cannot be any header information at the top of the spreadsheet. The first row of the spreadsheet must contain the name of the data in that column.** When the Excel import option is selected, the form on the following page is displayed.

First, use the drive and directory lists to navigate through the directory structure until the Excel file is displayed in the “Source File” List. Then type the name of the Excel sheet into the “Input Excel Sheet Name” field. The name of the Excel sheet is shown in the tab names at the



bottom of the spreadsheet (if you bring it up in Excel). Then, select the filename of the Spreadsheet from the “Source Files” list. The pull-down list of Excel fields will be automatically populated.

In order to import the data, the program must know what each field of the Excel data corresponds to in the monument database record. Select a field from the “Field Name” list and a field from the “SEMMS Permissible Fields”, then press the “Link” button to establish the linkage. Established linkages can be unlinked by selecting the linkage and pressing the “Unlink” button. **Not all of the Excel fields have to be linked.** Additional database fields may be populated for each imported record by using append fields. Select a SEMMS permissible field from the list. If the field has a domain associated with it the possible values are shown in the “Selected SEMMS Field Domain Value” pull-down list. If the field has no domain, then just type the desired value into the “Selected SEMMS Field Domain Value” field. Press the “Append to Each Imported Record” button. The additional value to store will be shown in the list above the Append button. Append values may be deleted by selecting it from the List and then pressing the “Delete Selected Field” button. If the input data coordinate system is in Easting/Northing, and not Latitude/Longitude, SEMMS will automatically calculate and populate the Latitude/Longitude fields. When the Easting linkage is established, the following form will be displayed reminding the operator of the information needed to perform the conversion.



When the mapping between Excel fields and SEMMS fields has been completed press the “Try It First!” button. As each monument record is imported, it’s designation is shown in the status line at the bottom of the form. The monuments will be imported into a temporary data base table in order to test the operation. If any records fail to import, a descriptive error message will be displayed suggesting possible causes of the problem. If all records import successfully, then press the “import” button to actually import them in the monumentation table. When all desired Excel files have been processed, press the “Exit” button to return to the import options form.

### 3.1.6 ACCESS-Format Monument Data

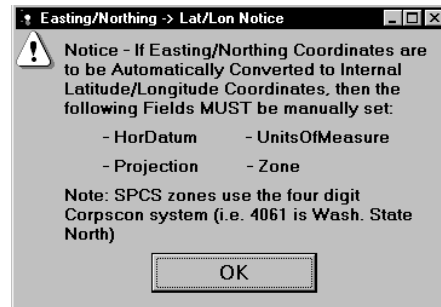
This capability allows an operator to import external data from other ACCESS databases not using the SEMMS monument structure. When the ACCESS import option is selected, the following form is displayed.

First, use the drive and directory lists to navigate through the directory structure until the ACCESS .mdb file is displayed in the “Source File” List. Then type the name of the table to import the data from into the “Input Database Table Name” field. Then, select the filename of the database from the “Source Files” list. The pull-down list of ACCESS fields will be automatically populated.

In order to import the data, the program must know what each field of the ACCESS data corresponds to in the monument database record. Select a field from the “Field Name” list and a field from the “SEMMS Permissible Fields”, then press the “Link” button to establish the linkage. Established linkages can be unlinked by selecting the linkage and pressing the “Unlink” button. **Not all of the ACCESS fields have to be linked.** Additional database fields may be populated for each imported record by using append fields. Select a SEMMS permissible field from the list. If the field has a domain associated with it the possible values are shown in the “Selected SEMMS Field Domain Value” pull-down list. If the field has no domain, then just type the desired value into the “Selected SEMMS Field Domain Value” field. Press the “Append to Each Imported Record” button. The additional value to store will be shown in the list above the Append button. Append values may be deleted by selecting it from the list and then pressing the “Delete Selected Field” button.

If the input data coordinate system is in Easting/Northing, and not Latitude/Longitude, SEMMS will automatically calculate and populate the Latitude/Longitude fields. When the

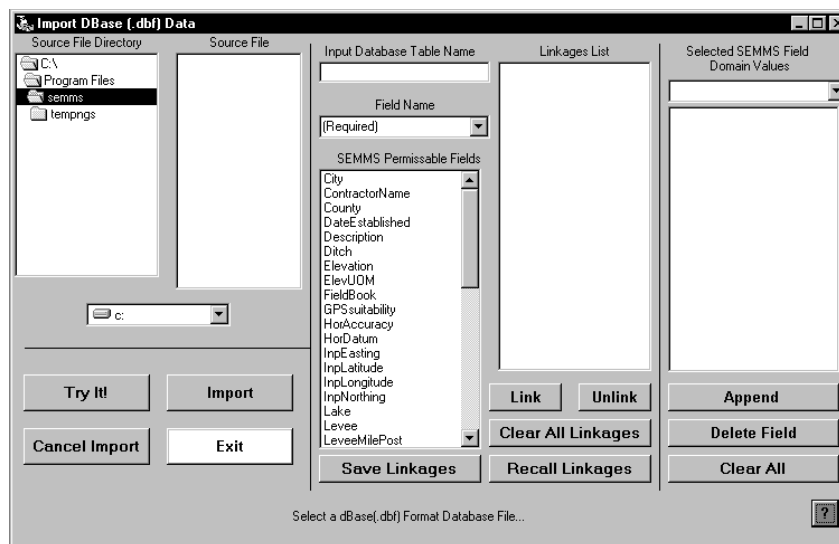
Easting linkage is established, the following form will be displayed reminding the operator of the information needed to perform the conversion.



When the mapping between ACCESS fields and SEMMS fields has been completed press the “Try It First!” button. As each monument record is imported, it’s designation is shown in the status line at the bottom of the form. The monuments will be imported into a temporary data base table in order to test the operation. If any records fail to import, a descriptive error message will be displayed suggesting possible causes of the problem. If all records import successfully, then press the “import” button to actually import them in the monumentation table. When all desired ACCESS files have been processed, press the “Exit” button to return to the import options form.

### 3.1.7 Dbase-Format Monument Data

This capability allows an operator to import external data from DBase-format databases. When the DBase import option is selected, the following form is displayed.

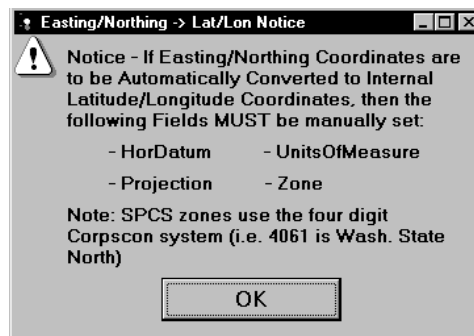


First, use the drive and directory lists to navigate through the directory structure until the DBase .dbf file is displayed in the “Source File” List. Then, select the filename of the database from the “Source Files” list. The pull-down list of DBase fields will be automatically populated.

In order to import the data, the program must know what each field of the DBase data corresponds to in the monument database record. Select a field from the “Field Name” list and a

field from the “SEMMS Permissible Fields”, then press the “Link” button to establish the linkage. Established linkages can be unlinked by selecting the linkage and pressing the “Unlink” button. **Not all of the DBase fields have to be linked.** Additional database fields may be populated for each imported record by using append fields. Select a SEMMS permissible field from the list. If the field has a domain associated with it the possible values are shown in the “Selected SEMMS Field Domain Value” pull-down list. If the field has no domain, then just type the desired value into the “Selected SEMMS Field Domain Value” field. Press the “Append to Each Imported Record” button. The additional value to store will be shown in the list above the Append button. Append values may be deleted by selecting it from the list and then pressing the “Delete Selected Field” button.

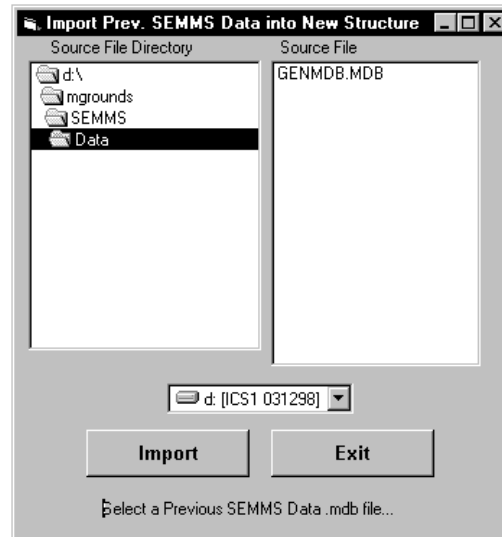
If the input data coordinate system is in Easting/Northing, and not Latitude/Longitude, SEMMS will automatically calculate and populate the Latitude/Longitude fields. When the Easting linkage is established, the following form will be displayed reminding the operator of the information needed to perform the conversion.



When the mapping between DBase fields and SEMMS fields has been completed press the “Try It First!” button. As each monument record is imported, it’s designation is shown in the status line at the bottom of the form. The monuments will be imported into a temporary data base table in order to test the operation. If any records fail to import, a descriptive error message will be displayed suggesting possible causes of the problem. If all records import successfully, then press the “import” button to actually import them in the monumentation table. When all desired DBase files have been processed, press the “Exit” button to return to the import options form.

### 3.1.8 Previous SEMMS Data Into a New Database Structure

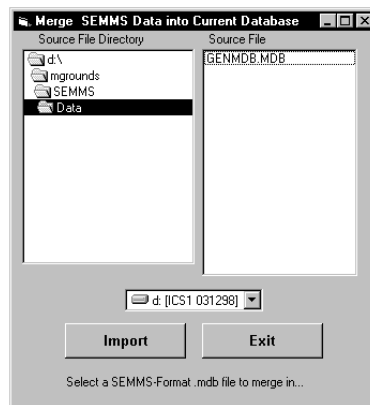
This capability allows the database structure to be changed, new tables added, and new fields added to existing table without requiring all of the original data to be re-imported. This capability copies the contents of each table in the old database to the new database. **This function requires the operator to rename the old monument.mdb before overwriting it with a new monument.mdb database structure.** When the “Import Previous SEMMS Monuments” option is selected, the form on the following page is displayed.



Use the drive and directory lists to find the renamed monument.mdb. Select the file from the “Source File” list and press the “Import” button. The status line at the bottom of the form will show processing status. When the process is complete, press the “Exit” button to return to the import options form.

### 3.1.9 Merging SEMMS Database Files

This capability external data in SEMMS format to be merged into the main monument database. When this option is selected and the import button is pressed the following form is displayed.



Use the drive and directory options to locate the source file to be imported. Then, select the source file and press the “Import” button. As each monument in the file is imported, it’s designation is displayed in the status/prompt line at the bottom of the form. Upon completion, press the “Exit” button to return to the import options form.

### 3.2 Adding New Monument Data

New monuments may be manually added to the monumentation database by using the “Add New Monument” button on the original add control points form shown in Section 3. When this button is pressed, the interface form shown on the following page is displayed.

**Add New Monument**

Main/Location   **Coordinates**   Monument/Ref./Vis.   Images

**HORIZONTAL**

Projection:    
Units of Measure:    
Zone:    
Datum:    
Accuracy:    
Input Latitude:      
Input Longitude:      
Input Easting:    
Input Northing:    
Internal Latitude:      
Internal Longitude:      
Date Established:    
**Note: Show the Internal Lat/Lon (NAD 83) by pressing the Calculate Button.**

**VERTICAL**

Units of Measure:    
Datum:    
Elevation:    
Accuracy:    
Origin:    
Date Established:    
**LOCAL**   
Units of Measure:    
Easting (x):    
Northing (y):    
Station:    
**Calculate Lat/Lon**

**Search for Control**   **Save Record**   **Exit**   **EXIT SEMMS**   ?

This form contains text fields and pull-down fields for all of the fields used in SEMMS to establish a monument record. Use the tabs along the top of the form to display new fields associated with each tab category.

Of special note is the Coordinates tab, shown below, which allows the internal Latitude/Longitude to be calculated when Easting/Northing coordinates are specified or Lat/Lon coordinates are specified in NAD 27.

Internal Latitude/Longitude is always in the NAD 83 datum. It is used as a common coordinate system for all monuments in the database. This calculation is performed when the operator presses the “Calculate Lat/Lon” button on the form, and uses the integral Corpscon converter. The calculation is performed using the values of the Projection, Units, Zone, and Datum fields specified at the top of the form.

When all appropriate fields have been defined then press the “Save Record” button to add the monument to the database.

**Add New Monument**

Main/Location   Coordinates   Monument/Ref./Vis.   Images

**Monument Name:**  (Recorded Designation)   
**Stamped Designation:**  (Actual Stamped Name)   
**NGS PID:**    
**Organization Name:**    
**Project Name:**    
**Contractor Name:**    
**Mon. Owner:**    
**State:**    
**City:**    
**Quad Name:**    
**County:**    
**Township:**    
**Range:**    
**Section:**    
**River Name:**    
**River Mile:**    
**Minus Mile:**    
**Ditch Name:**    
**Levee Name:**    
**Levee Mile Post:**    
**RailRoad Name:**    
**Road Name:**    
**Lake Name:**    
**Search for Control**   **Save Record**   **Exit**   **EXIT SEMMS**   ?

#### 4. Searching for Control Points/ Modifying Monument Fields

This chapter describes how SEMMS is used to search for control points. It describes how to search based upon a specified criteria, and how to perform spatial searches. This section shows how to view and print summary and detailed reports of query results. Export capabilities are described for outputting query results to ASCII files, .dxf graphics files, or to a field database. This section also describes how to modify the fields of monuments satisfying the query criteria (i.e. monument modification).

When the “Search for Control Points” button on the SEMMS main form is pressed the following form is displayed.

**Search for Control Points**

Type: ☐ Vertical Only (1D) ☐ Horizontal Only (2D) ☒ All Monuments ?

☐ Horiz. And Vert. (3D)

Radius Search Rectangle Search Search Criteria

Selection Criteria ?

**Note: You Must Enter Selection Criteria, Radius, or Rectangle Search Criteria to Define the Basis of the Search.**

Search Clear Criteria/New Search

Exit this Form EXIT SEMMS

This form is used to specify criteria for searching the monument database. Each monument record contains a monument type field, 1D for Vertical control, 2D for Horizontal control, or 3D. Use the check boxes at the top of the form to select the type of control, or use the “All Monuments” check to disregard monument type. The middle of the form allows the operator to define searching criteria using both field values and also spatial limits. To specify the field values to search for press the “Selection Criteria” button. The program will load the criteria form with domain values found in the database for each field of a monument record. Then the form shown on the following page will be shown. This form consists of text fields and pull-down selection lists for each of the fields in a monument record. Set as many values as necessary to search for the monuments of interest.



When all of the search criteria have been specified press the “Exit” button to return to the main search form. All of the criteria specified will be shown in the list window on the search form. The search may be initiated immediately by pressing the “Search” button, or additional spatial limits may be defined by using the “Radius Search” or “Rectangle Search” tabs on the search form.

The Radius search tab, shown below, allows the operator to define a point and radius to search within. The program will return all monuments satisfying the search criteria that are within this radius.

The Latitude/Longitude and Easting/Northing coordinates used in the search do not necessarily have to match the datum, units, and projection of the monuments stored in the database. The search is actually conducted using the internal Lat/Lon coordinates of the monuments. The coordinate system of the spatial search criteria is defined using the “Define Coordinate System” button on the radius search form.

The “Get Nearest Monument” check will return the monument with the smallest distance to the point defined. This smallest distance is shown in the “Radius” field.

The Rectangle search tab, shown on the following page, allows the operator to define a search rectangle. The program will return all monuments satisfying the search criteria that are within this rectangle.

The Latitude/Longitude and Easting/Northing coordinates used in the search do not necessarily have to match the datum, units, and projection of the monuments stored in the database. The search is actually conducted using the internal Lat/Lon coordinates of the monuments. The coordinate system of the spatial search criteria is defined using the “Define Coordinate System” button on the radius search form.

Press the “Search” button on the search form to initiate the database search. After a short processing delay, the search results form, shown below, is displayed which shows the query results.

The number of monuments found which satisfy the search criteria are shown at the top of the form. If zero monuments were found, the operator may wish to relax the search criteria. This form also allows the operator to specify how monument coordinates are to be shown in subsequent forms. Use the pull-down lists to fill in the Horizontal datum, Horizontal Units, Vertical Datum, and Vertical Units. Use the check marks to specify the projection. If a state plane (SPCS) projection is used, specify the zone using the SPCS zone pull-down list at the bottom of the form. If monuments in the search results cover multiple SPCS zones, then leave the zone field blank. SEMMS will use the value contained in the database record. Press the “Preview Results” button to view the monuments which satisfied the search criteria.

A monumentation summary form, shown below, will then be displayed which summarizes the search results.

Monumentation Summary									
PID	Name	Latitude	Longitude	Elevation	Hor.	Vert.	Type		
JE0710	EE 252	38 29 31.9 94	51 59.13	NAD 27 835.47Svy Ft	NGVD 29	SECOND	1D		
JE0711	E 252	38 28 56.9 94	51 57.13	NAD 27 851.07Svy Ft	NGVD 29	SECOND	1D		
JE0712	E 252 RESET	38 28 56.9 94	51 57.13	NAD 27 851.02Svy Ft	NGVD 29	SECOND	1D		
JE0713	DD 252	38 28 3.94 94	51 54.13	NAD 27 865.02Svy Ft	NGVD 29	SECOND	1D		
JE0715	D 252 RESET	38 27 34.9 94	51 50.13	NAD 27 878.34Svy Ft	NGVD 29	SECOND	1D		
JE0716	CC 252	38 26 32.9 94	51 11.13	NAD 27 906.49Svy Ft	NGVD 29	SECOND	1D		
JE0718	C 252 RESET	38 25 47.9 94	50 35.13	NAD 27 933.55Svy Ft	NGVD 29	SECOND	1D		
JE0719	BB 252	38 25 .934 94	49 57.13	NAD 27 911.48Svy Ft	NGVD 29	SECOND	1D		
JE0720	B 252	38 24 48.9 94	49 32.13	NAD 27 895.40Svy Ft	NGVD 29	SECOND	1D		
JE0721	A 252	38 23 20.9 94	48 29.14	NAD 27 844.06Svy Ft	NGVD 29	SECOND	1D		
JE0777	T 274	38 28 43.9 94	57 18.12	NAD 27 862.52Svy Ft	NGVD 29	SECOND	1D		
JE0779	S 274 RESET	38 28 1.94 94	57 19.12	NAD 27 943.01Svy Ft	NGVD 29	SECOND	1D		
JE0782	J 278	38 27 5.93 94	58 23.12	NAD 27 1052.8Svy Ft	NGVD 29	SECOND	1D		
JE0783	K 278	38 26 31.9 94	59 30.11	NAD 27 1064.8Svy Ft	NGVD 29	SECOND	1D		
JE0784	N 221	38 29 40.9 94	58 41.12	NAD 27 870.57Svy Ft	NGVD 29	SECOND	1D		
JE0785	J 260	38 29 31.9 94	57 33.12	NAD 27 856.30Svy Ft	NGVD 29	SECOND	1D		
JE0786	P 221	38 29 52.9 94	57 8.125	NAD 27 864.86Svy Ft	NGVD 29	SECOND	1D		
JE0823	N 222	38 41 13.9 94	50 15.13	NAD 27 918.17Svy Ft	NGVD 29	SECOND	1D		
JE0824	P 222	38 39 43.9 94	51 2.137	NAD 27 907.39Svy Ft	NGVD 29	SECOND	1D		
JE0825	Q 222	38 38 5.95 94	51 55.13	NAD 27 874.80Svy Ft	NGVD 29	SECOND	1D		
JE0826	R 222	38 36 33.9 94	52 36.13	NAD 27 866.50Svy Ft	NGVD 29	SECOND	1D		
JE0829	PAOLA	38 34 28.9 94	52 20.13	NAD 27 960.50Svy Ft	NGVD 29	SECOND	1D		
JE0830	H 252	38 33 21.9 94	52 46.13	NAD 27 854.19Svy Ft	NGVD 29	SECOND	1D		
JE0831	G 252	38 31 58.9 94	51 43.13	NAD 27 872.61Svy Ft	NGVD 29	SECOND	1D		
JE0832	F 252	38 30 13.9 94	51 55.13	NAD 27 860.92Svy Ft	NGVD 29	SECOND	1D		

This summary of monuments may be printed to hardcopy by pressing the “Print All” button. A preview form will then be shown which allows the report to be printed or exported to an ASCII or Excel file. A sample summary report is shown below.

Survey Engineering Monumentation Management System (SEMMS)									
Monumentation Summary Report									
Horizontal Datum:		NAD 83		Vertical Datum:		NGVD 29			
Projection:		UTM		Units:		Svy Ft			
Zone:		18							
Units:		Svy Ft							
PID	Name	Latitude	Longitude	Easting	Northing	Elevation	Hor.	Vert.	Mon.
AA9235	ILG ARP	39 40 42.34082	75 36 25.71373	1,469,590.27	14,410,217.26	69.533	B		3D
AA9236	ILG STA B AP	39 40 9.58566	75 36 15.66997	1,470,352.95	14,406,898.93	74.093	FIRST		3D
AA9237	ILG STA A AP	39 41 18.54699	75 36 7.75333	1,471,018.57	14,413,869.90	59.051	FIRST		3D
g12		39 15 31.24464	97 01 57.26528	317,869,554.81	0.00	1,244.060	1st order to be deterr		3D
JU0783	ARCHEMERE	39 48 15.62205	75 27 15.02427	1,512,862.44	14,455,810.41	93.006	SECOND	FIRST CLAS	3D
JU0786	PRINTZ	39 47 45.21011	75 27 27.67626	1,511,859.68	14,452,739.35	18.456	SECOND	FIRST CLAS	3D
JU0789	LEX	39 47 19.78290	75 28 4.60639	1,508,964.82	14,450,182.36	23.561	SECOND	FIRST CLAS	3D
JU0797	STONEY	39 46 28.89461	75 28 53.86876	1,505,093.12	14,445,055.55	11.579	SECOND	FIRST CLAS	3D
JU0804	LORE	39 45 26.79325	75 29 33.32724	1,501,978.94	14,438,790.95	39.540	SECOND	FIRST CLAS	3D

The header information at the top of the page shows the specifications set in the query results form for generating coordinate values.

All of the capabilities described in the following sections require that a single monument or group of monuments be selected from the summary list. Just click on a monument to select it or use the <cntrl> and <shift> keys to select multiple monuments. The following sections describe the monument details, deleting monuments, exporting monuments, and modifying a monument.

## 4.1 Obtaining Monument Details

From the summary form, select the monuments to be processed. Then press the “Details” button. The following form will be shown.

The screenshot shows the 'Main' tab of the SEMMS application. The 'Monument Details' section contains the following information:

Designation: C 252 RESET	PID: JE0718
Stamped Designation: C 252 RESET 1949	
Project:	Organization:
Contractor:	Date Est.:
Mon. Owner: NGS	
State: KS	Quad: FONTANA (1978)
County: MIAMI	City:
Latitude: 38 25 47.93633	Longitude: 94 50 35.13782 NAD 27
Easting: -1604796.542	Northing: 3151947.298 Svy Ft NAD 27
Projection: SPCS	Zone: Alabama West State Plane
Hor. Accuracy:	
Elevation: 933.559 NGVD 29	Vert. Accuracy: SECOND CLASS
	Origin: ADJUSTED
Discriminator: 1D	GPS Suitability:
Quality: C	Type: DB
Township:	Range:
Section:	Railroad:

At the bottom of the form are buttons for 'Print All Records', 'Print Current Record', 'Next', 'Previous', 'Exit this Form', and 'EXIT SEMMS'.

The “Main” tab shows the values for each of the fields in a monument record. The “Description” tab shows the monument description. The “Images” tab displays images which may be associated with a monument. Cycle through the monuments selected from the summary form by using the “Next” and “Previous” buttons. Detail reports for all selected monuments can be generated by pressing the “Print All Records” button. Or, the currently displayed record can be printed by pressing the “Print Current Record” button. A sample of the details report is shown below.

The sample report is titled 'Survey Engineering Monumentation Management System (SEMMS) Monumentation Details Report'. It includes a logo of a surveying instrument. The report details for PID: JU0783 and Name: ARCHEMERE are as follows:

PID: JU0783	Name: ARCHEMERE
Project:	Organization: ARCHEMERE 1959
Stamped: ARCHEMERE 1959	
Quad: MARCUS HOOK (1987)	State: DE
County: NEW CASTLE	City:
Latitude: 39 48 15.62205 NAD 83(1991)	Longitude: 75 27 15.0242 NAD 83(1991)
Easting: 1,512,862.44	Northing: 14,455,810.41 NAD 83(1991)
Zone:	
Elevation: 93.006	
Hor. Accuracy: SECOND	Vert. Accuracy: FIRST CLASS II
Discriminator: 3D	Mon. Quality: C
Mon. Type: DS	Rod Type:
Owner: NGS	Contractor:
Description: DESCRIBED BY COAST AND GEODETIC SURVEY 1956 (HRL) STATION IS LOCATED ABOUT 6.0 MILES NORTHEAST OF THE POST OFFICE IN WILMINGTON AND ABOUT 0.75 MILE WEST OF THE MOUTH OF NAAMAN	

## 4.2 Deleting Monuments

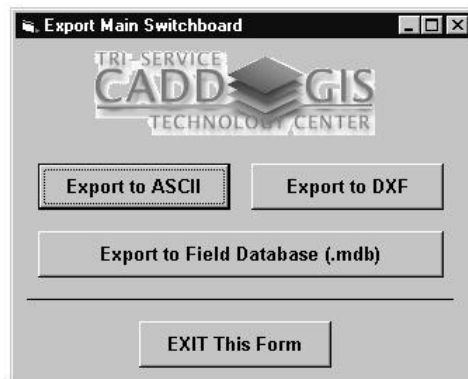
From the summary form, select the monuments to be processed. Then press the “Delete!” button. The following form will be shown.



Press the “Delete All Selected Monuments!” button to confirm the delete action, or press “Cancel Delete Action” to cancel it.

## 4.3 Exporting Monuments

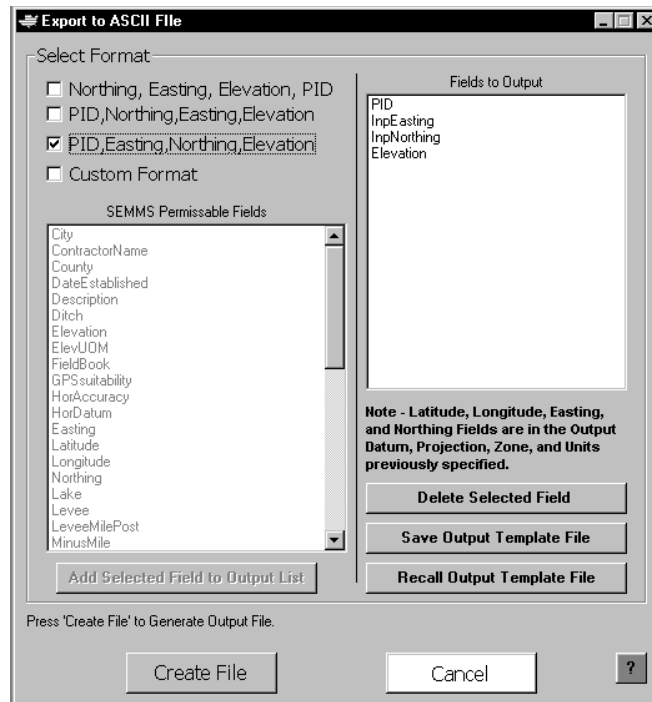
From the summary form, select the monuments to be processed. Then press the “Export Selected” button. The following form will be shown.



From this form, SEMMS will export the selected monuments to an ASCII file, a DXF graphics file, or to a field database in SEMMS format.

To generate an ASCII file, press the “Export to ASCII” button. The form on the following page will then be displayed. Standard ASCII files may be generated consisting of different sequences of PID, Easting, Northing, and Elevation fields. Select the sequence of these fields and then press the “Create File” button. Or, a custom file may be generated consisting of any sequence of any number of SEMMS monument record fields. Select the “Custom Format” toggle to define the report format.

To define a custom format, select a SEMMS permissible field from the list. Then, press the “Add Selected Field to Output List”. The field will then be shown in the list of fields to output. The sequence of fields in the ASCII file will match the sequence in which fields are selected.



Standard output template files may be generated by defining a format and then pressing the “Save Output Template File” button.

To generate the ASCII file, press the “Create File” button. A file manager form is then shown. Use the drive and directory lists to navigate to the directory to create the file in. A read-only list shows report files already in the directory. Specify the name of the file to be created in the “Report File Name:” text field and then press “Save” to generate the ASCII file.

DXF files can be read by a variety of graphics display programs. When SEMMS generates a .dxf file it is a graphical representation of the selected monuments’ position. 1D, 2D, and 3D monuments are shown using different symbology for each. Along with each monument is a text label showing the monument designation. To generate a .dxf file press the “Export to DXF” button on the export form. A file manager form is then shown. Use the drive and directory lists to navigate to the directory to create the file in. A read-only list shows .dxf files already in the directory. Specify the name of the file to be created in the “Output Filename:” text field and then press “Save” to generate the file.

A field database can be generated by pressing the “Export Field Database (.mdb)” button on the export form. A file manager form is then shown. Use the drive and directory lists to navigate to the directory to create the file in. A read-only list shows .mdb files already in the directory. Specify the name of the file to be created in the “Output Filename:” text field and then press “Save” to generate the file.

## 4.4 Modifying a Monument

To modify a particular monument, select it from the list of monuments in the summary form and then press the “Modify” button. The following form is then displayed.

**Modify Selected Monument C 252 RESET (JE0718)**

**Main/Location**    Coordinates    Monument/Ref/Vis.    Images

**Monument Name:** C 252 RESET (Recorded Designation)

**Stamped Designation:** C 252 RESET 1949 (Actual Stamped Designation)

**PID:** JE0718

**Organization Name:** [Dropdown]

**Project Name:** [Dropdown]

**Contractor Name:** [Dropdown]

**Monument Owner:** NGS

**State:** KS

**City:** [Dropdown]

**Quad Name:** FONTANA (1978)

**County:** MIAMI

**Township:** [Dropdown]

**Range:** [Dropdown]

**Section:** [Dropdown]

**River Name:** [Dropdown]

**River Mile:** [Dropdown]

**Minus Mile:** [Dropdown]

**Ditch Name:** [Dropdown]

**Levee Name:** [Dropdown]

**Levee Mile Post:** 0

**RailRoad Name:** [Dropdown]

**Road Name:** [Dropdown]

**Lake Name:** [Dropdown]

**Update Record**    **Exit This Form**    **Exit SEMMS**    ?

This form consist of 4 tabs of fields grouped by category. Populated fields from the monument record are shown on the form. Fill in additional fields, modify existing field values, or delete fields. Then press the “Update Record” button to modify the monument record.

## 5. Database Management

This chapter describes how to manage the domains associated with selection lists for many of the fields composing a monument record. The procedures for viewing a field's domain list, adding to the list, and deleting a value from the list are discussed.

Press the "Database Management" button on the SEMMS main form. The following form is then displayed.

Domain Tables	
<input checked="" type="checkbox"/> Horizontal Accuracy	<input type="checkbox"/> Ditch
<input type="checkbox"/> Horizontal Datum	<input type="checkbox"/> Levee
<input type="checkbox"/> Projection	<input type="checkbox"/> County
<input type="checkbox"/> SPCS Zones	<input type="checkbox"/> Organization
<input type="checkbox"/> UTM Zones	<input type="checkbox"/> Quad
<input type="checkbox"/> Units of Measure	<input type="checkbox"/> River Name
<input type="checkbox"/> Vertical Accuracy	<input type="checkbox"/> State
<input type="checkbox"/> Vertical Datum	<input type="checkbox"/> Township
<input type="checkbox"/> Vertical Origin	<input type="checkbox"/> Project
<input type="checkbox"/> Monument Type	<input type="checkbox"/> Rail Road
<input type="checkbox"/> Monument Quality	<input type="checkbox"/> Road Name
<input type="checkbox"/> Rod Material	<input type="checkbox"/> City
<input type="checkbox"/> Contractor	<input type="checkbox"/> Range
<input type="checkbox"/> Lake Name	<input type="checkbox"/> Mon. Owner

There is a check mark for each monument record field which has a domain associated with it. To view the set of values composing the domain for that field simply set the check mark. The current domain values are shown in the "Current Values" list. To add to the list, type in a new value in the "Value" text field and press the "Add" button. The new value should then be included in the list. To delete a value, select the value from the list and then press the "Delete" button. To modify a value, first delete it, and then add it back to the list with the modification incorporated.



## Chapter 6: Database Construction/Schema

This chapter provides a complete description of all tables in the SEMMS database, monument.mdb. The fields which compose each table are defined and the primary information flow between tables is illustrated.

### 6.1 Table Structure

The tables in SEMMS consist of the main monument table, a monument import test table, information flow/report tables, and domain tables. The main monument table is **tblMnMonument**, the fields composing the table are described later in this section. The monument import test table, **tmpMnMonument**, is an exact twin of the main monument table which supports the capability to test whether external data will import into SEMMS successfully. The information flow/report tables support the information flow from querying the database, to reviewing a summary of query results, to reviewing details of the summary monuments, to generating summary and detailed reports. The information flow/report tables consist of:

- o **QueryResults**
- o **QueryDetails**
- o **ProjPos**

The remainder of the SEMMS tables are all domain tables which store lists of allowable values available for selection from the various pick lists available throughout SEMMS. The domain tables fall into two categories, allowable values for entering new monuments, and “as-is” lists of values imported into SEMMS from external digital data. This distinction is important because although allowable domain lists are provided in adding new monument for consistency, the search criteria should reflect what is actually in the database. Searching should not be restricted to allowable values only because there is no filtering of values when the data is imported. The domain tables containing allowable lists of values are:

- o **tblDomFixHorAccuracy**
- o **tblDomFixMonDiscriminator**
- o **tblDomFixMonQuality**
- o **tblDomFixProjection**
- o **tblDomFixRodType**
- o **tblDomFixSPCZones**
- o **tblDomFixUnitOfMeasure**
- o **tblDomFixVerAccuracy**
- o **tblDomFixVerDatum**
- o **tblDomFixVerOrigin**
- o **tblDomUserMonType**
- o **tblDomUsrHorDatum**
- o **tblDomUsrOrgName**
- o **tblDomUsrUTMZones**
- o **NewCityDomain**
- o **NewContractorDomain**
- o **NewCountyDomain**
- o **NewDitchDomain**
- o **NewLakeDomain**
- o **NewLeveeDomain**
- o **NewOrganizationDomain**
- o **NewOwnerDomain**
- o **NewProjectDomain**

- o NewQuadDomain
- o NewRailRoadDomain
- o NewRangeDomain
- o NewRiverDomain
- o NewRoadDomain
- o NewStateDomain
- o NewTownshipDomain

The domain tables containing actual “as-is” lists of values follow below:

- o city\_d
- o contractor\_d
- o county\_d
- o date\_est\_d
- o ditch\_name\_d
- o hor\_accuracy\_d
- o hor\_datum\_d
- o lake\_d
- o levee\_name\_d
- o lmp\_d
- o minum\_mile\_d
- o mon\_name\_d
- o mon\_quality\_d
- o mon\_type\_d
- o org\_name\_d
- o owner\_d
- o proj\_name\_d
- o quad\_d
- o railroad\_d
- o range\_d
- o river\_mile\_d
- o river\_name\_d
- o road\_d
- o rod\_type\_d
- o section\_d
- o state\_d
- o township\_d
- o vert\_accuracy\_d
- o vert\_datum\_d
- o vert\_origin\_d

The following sections define the fields which compose the SEMMS data tables. The name of each field, type of data contained, and definition of the field are provided. The main monument table, **tblMnMonument**, the test import table, **tmpMnMonument**, the summary query results table, **QueryResults**, and the details results table, **QueryDetails**, consist of:

Name	Type	Size (bytes)
ctrMonument	Number (Long)	4
MonumentName	Text	30
StampedDesignation	Text	30
MonOwner	Text	50
PID	Text	10

OrgName	Text	50
ProjName	Text	50
DateEstablished	Date/Time	8
ContractorName	Text	50
City	Text	50
County	Text	50
State	Text	20
Township	Text	50
Range	Text	10
Section	Text	2
MonDiscriminator	Text	10
GPSsuitability	Text	10
MonQuality	Text	10
MonType	Text	10
RodType	Text	10
HorDatum	Text	20
IntLatitude	Number (Double)	8
IntLongitude	Number (Double)	8
HorAccuracy	Text	10
RecovNarrative	Memo	-
VisibleMonument	Memo	-
River	Text	50
RiverMile	Number (Long)	4
MinusMile	Number (Double)	8
Ditch	Text	50
Levee	Text	50
LeveeMilePost	Number (Double)	8
Railroad	Text	50
Road	Text	50
Quad	Text	50
FieldBook	Text	50
image1	Text	50
image2	Text	50
image3	Text	50
Lake	Text	50
Projection	Text	10
UnitsOfMeasure	Text	10
Zone	Text	50
InpEasting	Number (Double)	8
InpNorthing	Number (Double)	8
InpLatitude	Text	50
InpLongitude	Text	50
VertDatum	Text	20
Elevation	Number (Double)	8
ElevUOM	Text	10
VertAccuracy	Text	20
Description	Memo	-
VertOrigin	Text	20
LocHorUOM	Text	10
RodDepth	Number (Double)	8
NegIntLon	Number (Double)	

Although there are a lot of domain tables, each has an identical structure consisting of the following fields:

Name	Text (40 Characters)
Counter	Number (Integer)

## 6.2 Information Flow

The SEMMS information flow, illustrated on the following page, shows how the base monument data located in the main monument table, **tblMnMonument**, is used to populate the report tables in response to a search query. The temporary monument table, **tmpMnMonument**, is populated with monuments from the main table which satisfy the query criteria. Then, based upon the datum, projection, and units values specified by the user on the query results form, the **QueryResults** table is populated with these monuments and the InpEasting, InpNorthing, InpLatitude, InpLongitude, elevation, projection, zone, horizontal and vertical datum, and horizontal and vertical UOM are modified to reflect the coordinate system values specified by the user. These monuments are used to create the summary report of monuments satisfying the query. When the user selects monuments from the summary list and presses the details button the selected monuments are used to populate the **QueryDetails** table. This table is used to generate the details form and report.

## Tables

**tblMnMonument**  
-Contains all Monuments

Apply Criteria

**tmpMnMonument**  
-Contains Monuments  
Satisfying Query &  
Spatial Criteria

Calculate Coordinates

**QueryResults**  
-Same as **tmpMnMonument**  
with Calculated Coordinates  
& modified zone, proj, UOM,  
Datum

Copy Only Selected Monuments

**QueryDetails**  
-Same as **QueryResults**  
for Monuments Selected  
from Summary Table

**Search for Control Points**

Type: ☐ Vertical Only (1D) ☐ Horizontal Only (2D) ☒ All Monuments

☐ Horiz. And Vert. (3D)

Radius Search ☐ Rectangle Search ☐ Search Criteria

HorDatum=NAD 27

Selection Criteria

Search  Clear Criteria/New Search

Exit this Form  EXIT SEMMS

**Query Results**

Control Points Found: 115

Preview Results

Horizontal: NAD 83

Units: Svy Ft

Vertical Datum: NGVD 29

Units: Svy Ft

☐ Local ☐ UTM ☒ SPCS

SPCS Zone: Alabama West State Plane

Exit this Form  EXIT SEMMS

PID	Name	Latitude	Longitude	Elevation	Hor.	Vert. Type
4002	BEACON #2	30 18 8.86 88 16 43.98	NAD 83 0	Svy Ft		
4003	LABATRE RAMP	30 22 58.2 88 16 14.98	NAD 83 0	Svy Ft		
4004	REAR RG. CASOT	30 15 45.6 88 30 46.30	NAD 83 0	Svy Ft		
4005	POPE	30 19 14.7 88 30 1.777	NAD 83 0	Svy Ft		
6001	6002	30 25 38.1 88 32 38.86	NAD 83 0	Svy Ft		
6002	BULL	30 24 15.8 88 35 7.661	NAD 83 0	Svy Ft		
6003	TICK	30 25 11.9 88 31 18.92	NAD 83 0	Svy Ft		
6004	PBC-27-3	30 21 5.73 88 33 54.21	NAD 83 0	Svy Ft		
6005	REAR RANGE CUT	30 20 44.4 88 30 45.68	NAD 83 0	Svy Ft		
6006	PI #6	30 23 3.89 88 34 9.657	NAD 83 0	Svy Ft		
6007	20E-1C RM-3	30 20 21.8 88 31 36.46	NAD 83 0	Svy Ft		
6008	FORD O/S	30 20 37.7 88 33 30.57	NAD 83 0	Svy Ft		
6009	20-10	30 22 6.78 88 34 15.12	NAD 83 0	Svy Ft		
6010	V-192	30 22 20.8 88 33 52.21	NAD 83 0	Svy Ft		
6011	OSU-3	30 23 34.4 88 30 20.71	NAD 83 0	Svy Ft		
6012	PT-C	30 23 32.1 88 52 59.75	NAD 83 0	Svy Ft		
6013	BRIDGE RESET	30 24 34.4 88 30 29.06	NAD 83 0	Svy Ft		
6014	HORROV	30 23 47.8 88 31 33.32	NAD 83 0	Svy Ft		
6015	MARS	30 21 39.8 88 35 51.36	NAD 83 0	Svy Ft		
6016	ENC-31-1	30 24 5.44 88 39 31.32	NAD 83 0	Svy Ft		
6017	BB-31-4	30 24 5.18 88 39 32.07	NAD 83 0	Svy Ft		
6018	BB-4	30 25 9.70 88 53 29.34	NAD 83 0	Svy Ft		
6019	20-20	30 23 27.6 88 53 13.59	NAD 83 0	Svy Ft		
6020	BILLO	30 23 38.8 88 54 4.562	NAD 83 0	Svy Ft		
6021	BBC-34-8	30 25 9.37 88 56 26.55	NAD 83 0	Svy Ft		

Modify  Details  Delete  Print All  Export Selected  Exit this Form

**Survey Engineering Monumentation Management System**

Main ☒ Description ☐

Details of Query Results

Corps of Engineers Survey Engineering Monumentation Management System

Designation: REAR RG. CASOTTE PID: 4004

Stamped Designation: Organization:

Project: Date Est.:

Contractor: Mon. Owner:

State: Quad:

County: City:

Latitude: 30 15 45.64183 Longitude: 88 30 46.30724 NAD 83

Easting: 1048733.539 Northing: 96953.076 Svy Ft NAD 83

Projection: SPCS Zone: 102

Hor. Accuracy: Vert. Accuracy:

Elevation: 0 NGVD 29 Origin:

Discriminator: GPS Suitability:

Quality: Type:

Print All Records  Print Current Record  Next  Previous

Exit this Form  EXIT SEMMS